IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Paul A. Levine	**Confirmation No.:**	9065
Serial No.:	10/728,511	**Examiner:**	Tammie K. Heller
Filed:	12/05/2003	**Art Unit:**	3766
Docket No.:	A03P1078US02		
For:	METHOD AND APPARATUS FOR IMPROVING SPECIFICITY OF ATRIAL TACHYCARDIA DETECTION TECHNIQUES IN DUAL-UNIPOLAR OR DUAL-BIPOLAR IMPLANTABLE CARDIAC STIMULATION SYSTEMS		

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby certify that this correspondence is being filed electronically on:

July 24, 2006

Estella Pineiro

Dear Sir:

In response to the Office Action mailed April 28, 2006, please amend the above-identified application as follows:

AMENDMENTS TO THE SPECIFICATION

Replace paragraph [0001] with the following:

[0001] This application is related to copending U.S. Patent Applications: 1) Serial No. [[_____]] 10/728,459, filed 12/05/2003, titled "Method and Apparatus for Improving Specificity of Atrial Tachycardia Detection Techniques in Dual-Unipolar or Dual-Bipolar Implantable Cardiac Stimulation" ~~(Attorney Docket No. A03P1078)~~; 2) Serial No. [[_____]] 10/728,500, filed 12/05/2003, titled "Method and Apparatus for Improving Specificity of Atrial Tachycardia Detection Techniques in Dual-Unipolar or Dual-Bipolar Implantable Cardiac Stimulation" ~~(Attorney Docket No. A03P1078US01)~~; and 3) Serial No. [[_____]] 10/728,659, filed 12/05/2003, titled "Method and Apparatus for Improving Specificity of Atrial Tachycardia Detection Techniques in Dual-Unipolar or Dual-Bipolar Implantable Cardiac Stimulation" ~~(Attorney Docket No. A03P1078US03); all applications filed concurrently herewith.~~

AMENDMENTS TO THE CLAIMS

Presented below is a complete set of claims with current status indicators.

1. (original) In an implantable cardiac stimulation device having an atrial bipolar lead and at least one ventricular lead, a method for determining an atrial rate comprising:

tracking refractory periods within both the atrial and ventricular channel signals; and

determining an atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods.

2. (original) The method of claim 1 wherein determining the atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods is only performed if automatic mode switching (AMS) is enabled in the implantable stimulation device or if an atrial high rate detection diagnostic event counter is enabled, otherwise the atrial rate is determined based only on events outside the refractory periods sensed via bipolar sensing.

3. (original) The method of claim 1 further comprising increasing a ventricular sensitivity during the refractory periods to at least equal that of an atrial sensitivity.

4. (original) The method of claim 3 wherein updating the atrial rate based on events detected inside the refractory periods using combined unipolar/bipolar sensing employs a modified combined unipolar/bipolar sensing logic comprising:

detecting R-waves on the ventricular channel;

detecting candidate P-waves on the atrial channel;

determining whether the candidate P-waves occur within a first period of time bracketing detected R-waves; and

if not, concluding the candidate P-waves are true P-waves; and

if so, increasing a sensitive on the ventricular channel to equal a sensitivity on the atrial channel during the period of time bracketing the R-waves and determining R-

waves are detected on the ventricular channel within a second, shorter, period of time bracketing the P-waves.

5. (original) The method of claim 4 further comprising:

concluding that the candidate P-waves are true P-waves if R-waves are not detected on the ventricular channel within the second, shorter, period of time bracketing the P-waves; and

concluding that the candidate P-waves are false P-waves otherwise.

6. (original) The method of claim 5 wherein the first period of time bracketing detected R-waves is about 400 milliseconds (ms) and the second period of time bracketing the P-waves is about 50 ms.

7. (original) The method of claim 1 further comprising opening relative refractory windows within the atrial and ventricular refractory periods and wherein the step of determining the atrial rate using combined unipolar/bipolar sensing within the refractory periods only applies to events within the relative refractory windows of the refractory periods.

8. (original) The method of claim 7 wherein tracking atrial and ventricular relative refractory windows within the atrial and ventricular signals comprises:

detecting an R wave on the ventricular channel;

initiating atrial and ventricular blanking intervals on the atrial and ventricular channels, respectively, following detection of the R wave for a predetermined blanking period of time; and

initiating atrial and ventricular relative refractory windows on the atrial and ventricular channels, respectively, immediately following completion of the atrial and ventricular blanking intervals for a predetermined relative refractory duration of time.

9. (original) The method of claim 8:

wherein the ventricular blanking interval has a duration shorter than an average R-T interval occurring during normal sinus rhythm; and

wherein the ventricular blanking interval and the relative refractory window together have a combined duration longer than the average R-T interval of normal sinus rhythm such that the T-wave typically occurs during the ventricular relative refractory window.

10. (original) The method of claim 8 wherein the atrial blanking interval has a duration equal to the ventricular blanking interval and the atrial relative refractory window has a duration equal to the ventricular relative refractory window such that the T-wave typically occurs during the atrial relative refractory window.

11. (original) The method of claim 1 further comprising comparing the updated atrial rate against atrial tachycardia detection threshold (ATDR) threshold and performing a mode switch if automatic mode switching (AMS) is enabled and if the rate crosses the ATDR threshold.

12. (original) The method of claim 1 further comprising comparing the updated atrial rate against atrial tachycardia detection threshold (ATDR) threshold and initiating an atrial high rate diagnosis procedure if automatic mode switching (AMS) is not enabled and if the rate exceeds the ATDR threshold.

13. (original) The method of claim 1 further comprising comparing the updated atrial rate against atrial tachycardia detection threshold (ATDR) threshold and continuing to asses the atrial rate using combined unipolar/bipolar sensing so long as the rate does not exceed the ATDR threshold.

14. (currently amended) In an implantable cardiac stimulation device having an atrial bipolar lead and at least one ventricular lead, a system comprising:

an atrial sense amplifier operative to sense atrial channel signals;

a ventricular sense amplifier operative to sense ventricular channel signals;

a control unit operative to track refractory periods within atrial and ventricular channel signals; and

an atrial rate determination unit ~~operative~~ programmed to determine an atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods.

15. (currently amended) In an implantable cardiac stimulation device having an atrial bipolar lead and at least one ventricular lead, a system comprising:

means for tracking refractory periods within both the atrial and ventricular channel signals; and

means ~~for determining~~ programmed to determine an atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods.

REMARKS

Claims 1-15 are currently pending in this application. Claims 14 and 15 have been amended. No new matter has been added by these amendments. Applicant has carefully reviewed the Office Action and respectfully requests reconsideration of the claims in view of the remarks presented below.

Double Patenting

Claims 14 and 15 were provisionally rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 9 and 10 of copending application serial no. 10/728,459.

Applicant herein submits a Terminal Disclaimer disclaiming the terminal part of the statutory term of any patent granted on the present application, which would extend beyond the expiration date of the full statutory term of any patent issuing from co-pending application serial no. 10/728,459.

Claims 1, 2, 7-11, 14 and 15 were provisionally rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 4 and 7-12 of copending application serial no. 10/728,500.

Applicant herein submits a Terminal Disclaimer disclaiming the terminal part of the statutory term of any patent granted on the present application, which would extend beyond the expiration date of the full statutory term of any patent issuing from co-pending application serial no. 10/728,500.

In view of the Terminal Disclaimer and the further remarks presented below, it is respectfully submitted that claims 1, 2, 7-11, 14 and 15 are in condition for allowance.

Claim Rejections Under 35 U.S.C. §102

Claims 14 and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,477,415 (Yerich). Claims 14 and 15 were also rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,731,980 (Moucharwar).

Independent claim 14 has been amended to recite an atrial rate determination unit programmed to determine an atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods. Independent claim 15 has been amended to recite means programmed to determine an atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods.

Applicant submits that both Yerich and Moucharwar fail to disclose the combinations of elements and features recited in independent claims 14 and 15, including an element programmed to determine an atrial rate using bipolar sensing outside the refractory periods and using combined unipolar/bipolar sensing within the refractory periods. Accordingly, Applicant requests reconsideration of the §102 rejections of these claims.

Allowable Subject Matter

Claims 3-6, 12 and 13 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

In view of the Terminal Disclaimers and remarks presented above with respect to the rejections of independent claim 1, Applicant believes claims 3-6, 12 and 13 are allowable without amendment. Applicant, however, reserves the right to amend these claims at a later time.

Claims 1-13 were indicated as allowable if the double patenting rejections were overcome. In view of the Terminal Disclaimers filed herewith, claims 1-13 are believed to be in condition for allowance.

CONCLUSION

Applicant has made an earnest and bona fide effort to clarify the issues before the Examiner and to place this case in condition for allowance. Therefore, allowance of Applicant's claims 1-15 is believed to be in order.

Respectfully submitted,

29 JUL 2006
Date

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